hp calculators

HP 17bII+ Logarithmic and exponential functions

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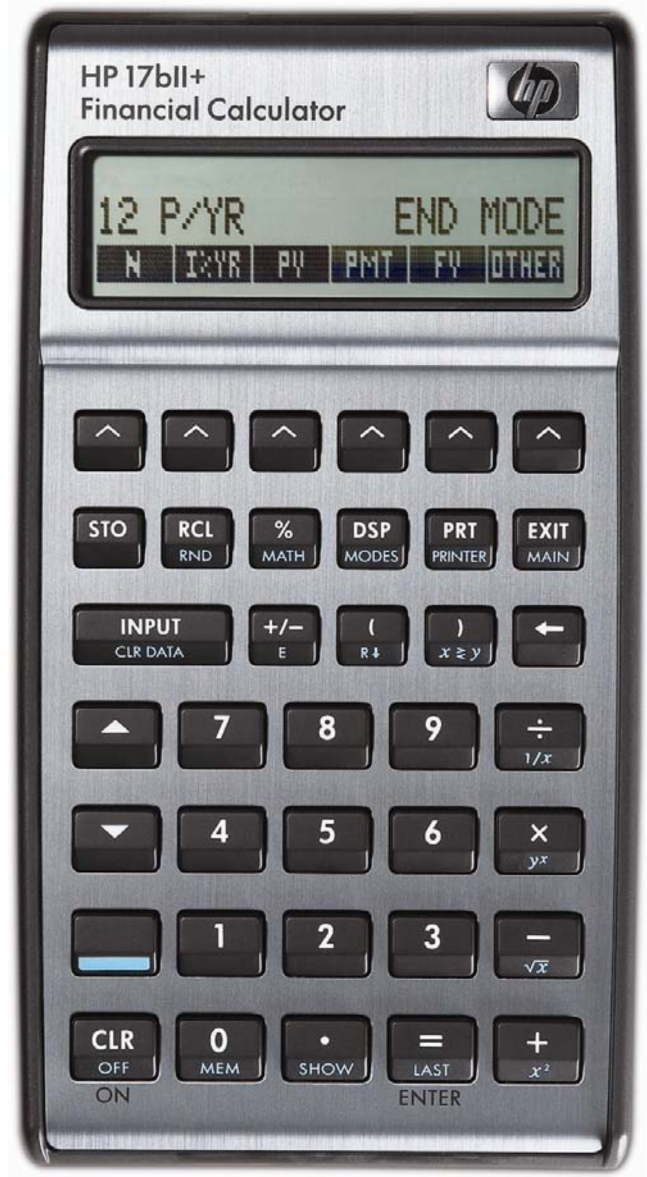
Practice solving problems involving logarithmic and exponential functions



Logarithmic and exponential functions

The HP 17bII+ can solve basic problems involving logarithms and exponential problems using the built-in log and exponential functions found on the MATH menu, as shown below. The math menu is access by pressing [shift] [% MATH]. These functions compute the natural logarithm and exponential functions as well as the common log and antilog functions.

Figure 1

Before calculators like the HP 17bII+ became easily available, logarithms were commonly used to simply multiplication. They are still used in many subjects, to represent large numbers, solve for unknowns in certain equations and in number theory.

Natural logarithms are also called "log to base *e*" and the natural logarithm of a number "x" is written LN x. Common logs are written as LOG x.

Practice solving problems involving logarithmic and exponential functions

Example 1: What is the value of X, in the equation: $2^X = 8$?

Solution: To solve this example, we'll apply one of the properties of logarithms which states that the logarithm of an base taken to a power is equal to the power multiplied by the log of the base. This involves taking the logarithm of both sides of the equation. The original equation would then look like this:

$$X\ LN(2) = LN(8)$$

Figure 2

X is therefore equal to:

$$X = \frac{LN(8)}{LN(2)}$$

Figure 3

In algebraic mode, press : [shift] [% MATH] [8] [LOG] [÷ 1/x] [2] [LOG] [= LAST]

In RPN mode, press : [shift] [% MATH] [8] [LOG] [2] [LOG] [÷ 1/x]

Answer: The value of X is 3. Note that even though this example used the common log in the solution, using the natural log would have worked just as well.

Example 2: Find $e^{4.5}$.

Solution: [shift] [% MATH] [4] [• SHOW] [5] [EXP]

Answer: 90.02. Note that e^x is abbreviated as EXP on the calculator menu.

Example 3: Evaluate: $5000 = 4000(1+0.05)^N$

Solution: First, rearrange the equation so that the part of the expression taken to the power of "N" is isolated on one side of the equal side.

$$\frac{5000}{4000} = (1+0.05)^N$$

Then, take the logarithm of each side.

$$LN\left(\frac{5000}{4000}\right) = N \times LN(1+0.05)$$

Finally, rearrange the equation so that N is by itself and solve for N.

$$\frac{LN\left(\frac{5000}{4000}\right)}{LN(1+0.05)} = N$$

In algebraic mode, press: [5] [0] [0] [0] [÷] [4] [0] [0] [0] [=] [÷] [shift] [(] [1] [+] [0] [•] [0] [5] [)] [shift] [%] [LN] [=]

In RPN mode, press: [5] [0] [0] [0] [=] [4] [0] [0] [0] [÷] [shift] [%] [LN] [1] [=] [0] [•] [0] [5] [+] [shift] [%] [LN] [÷]

Answer: 4.57